19755

SECRET
NO FOREIGN DISSEM

CENTRAL INTELLIGENCE AGENCY
UNITED STATES OF AMERICA

IMAGERY
ANALYSIS
DIVISION

PIR

PHOTOGRAPHIC INTELLIGENCE REPORT

DETAILED MENSURAL ANALYSIS OF SOVIET "N" CLASS SSN

CIA PIR 67007

DATE SEPT 1967

SECRET
NO FOREIGN DISSEM

CIA/PIR-67067

DETAILED MENSURAL ANALYSIS OF SOVIET "N" CLASS SSN

BACKGROUND

A Soviet "N" Class nuclear powered torpedo attack submarine, pendant number 119, was photographed [redacted] 25X1 while underway in the Barents Sea at position 72-20N, 035-05E. The fourteen (14) small format photographs provided by the Norwegian Service comprise the best photography taken to date of the "N" Class SSN. Selected views are incorporated within this report.

CAMERA/MENSURAL DATA

The photography utilized for this project was taken with a hand-held camera from a plane circling the submarine. The camera employed a 70mm format and had a non-calibrated 12" inch focal length. No other usable information was available regarding the camera or its space orientation. An approximate flying height of the aircraft was given as 300-500 feet. The only dimension on the submarine used for a mensural reference was an assumed distance (on a vertical plane) of one-fifth (1/5th) of a meter between the draft marks visible on the curved hull near the waterline.

PROCEDURE

For mensuration 4 1/2 time full format film positive enlargements were used and the image points measured on a Nistri comparator. The derived solution entailed configuration with conjugate imagery from multiple camera stations.

An equivalent focal length and tilt was computed for each exposure and a coordinate system adopted with the principle point as the origin and the Y-axis as the principle line. A mathematical model was constructed which would compute the camera stations of those exposures for which tilt, focal length, height 25X1

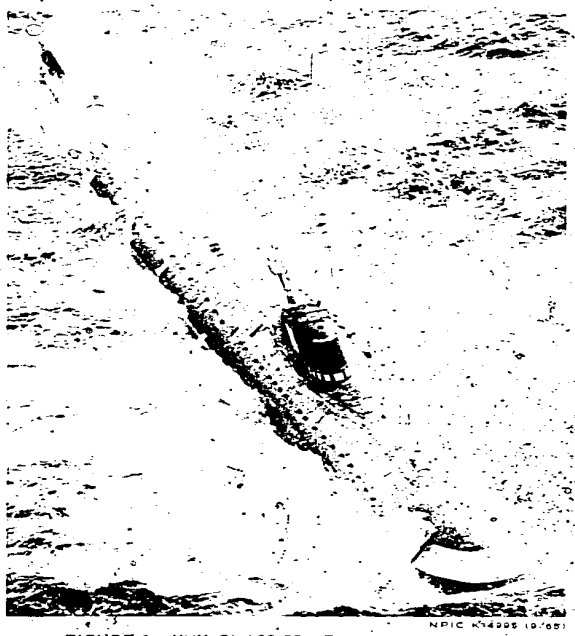


FIGURE 1. "N" CLASS SSN-FORWARD OBLIQUE

of camera above datum, and two object points imaged on at least two photographs were known. Once the camera stations were established, any object imaged on two or more of the photographs could be measured yielding a space coordinate X, Y, Z for that point. However, the initial height of the camera stations above datum was a first approximation; therefore, a correction was made in these heights utilizing the assumption that the height between draft marks is one-fifth of a meter. The camera stations were again computed and the object coordinates corrected. By inputing x, y from two or more photographs object coordinates X, Y, Z, were obtained. The object coordinates were graphically plotted and a finished line drawing (Figure 4) was made.

An attempt was made to graph the approximate cross-section of this submarine at the midship draft mark by plotting the position of each draft mark (located amidships on the starboard-side only of the submarine) as an X, Y coordinate. The curved line connecting each of these points was then drawn

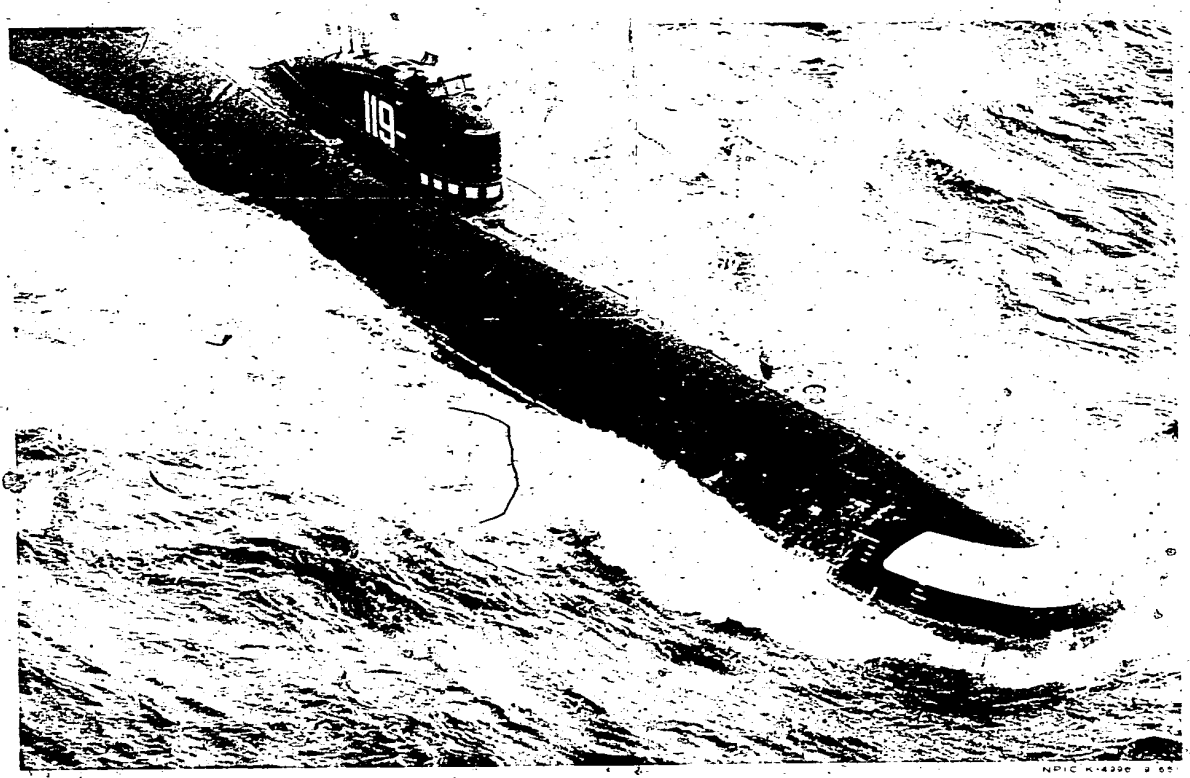
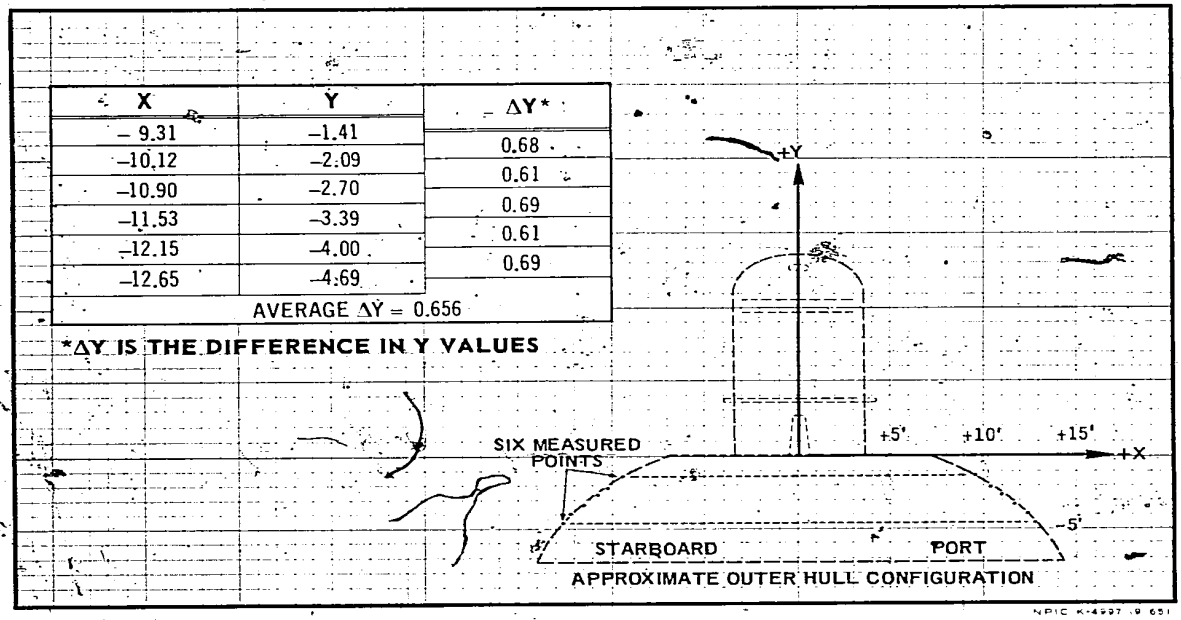


FIGURE 2. "N" CLASS SSN-BOW VIEW.

X	Y	ΔY*
– 9.31	–1.41	0.68
–10.12	–2.09	0.61
–10.90	–2.70	0.69
–11.53	–3.39	0.61
–12.15	–4.00	0.69
–12.65	–4.69	

AVERAGE ΔY = 0.656

*ΔY IS THE DIFFERENCE IN Y VALUES



NPIC K-4997 (9 65)

FIGURE 3. APPROXIMATE PLOT OF THE AMIDSHIPS (STARBOARD) DRAFT MARKS.

to form the approximate outer hull configuration of this submarine as illustrated by Figure 3 above. The coordinates plotted on the graph and included in the accompanying table above were derived from CIA photographs 1053371, 1053372, 1053373, and 1053375 utilizing the technique outlined above incorporating the method of least squares.

ACCURACY

The accuracy of this project is dependent upon the degree of accuracy by which the draft marks can be measured. Assuming that the draft marks are spaced one-fifth of a meter (0.656 feet) apart on a plane perpendicular to the water (in a calm sea), the maximum deviations, (Y) in the measured values are approximately plus 0.03 feet or plus 4.6% and minus 0.05 feet or minus 7.6%. (See the tabulated values for Δ Y in Figure 3 above). These percentages, as reflected in the length over-all dimension, are approximately plus 16 feet and minus 27 feet. It is believed, however, that the over-all accuracy is well within the maximum deviations indicated - or on the order of approximately plus or minus 3%. All measurements have been made by the NPIC Technical Intelligence Division.

CIA/PIR-67067

25X1

REFERENCES

DOCUMENTS

CIA. CSLT-313/01692-65 dated 16 June 1965 (SECRET No Foreign Dissem)

REQUIREMENT

C-SI5-82,697

CIA/IAD PROJECT

30823-5

CIA/PIR-671067

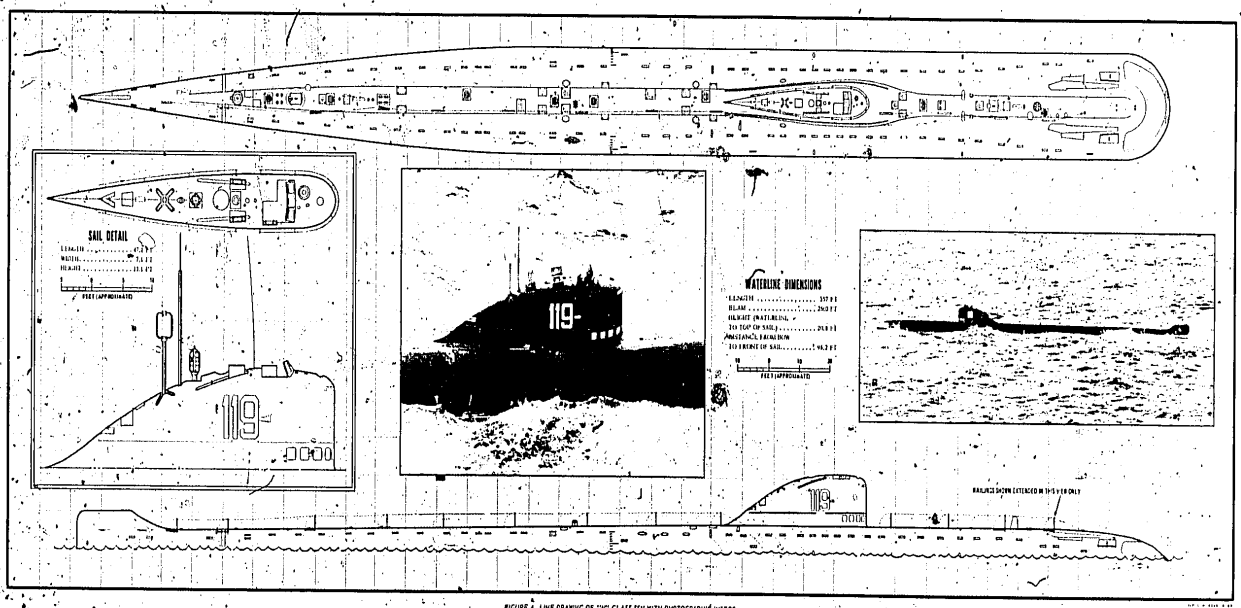


FIGURE 4. LINE DRAWING OF "N" CLASS SSN WITH PHOTOGRAPHIC INSETS.